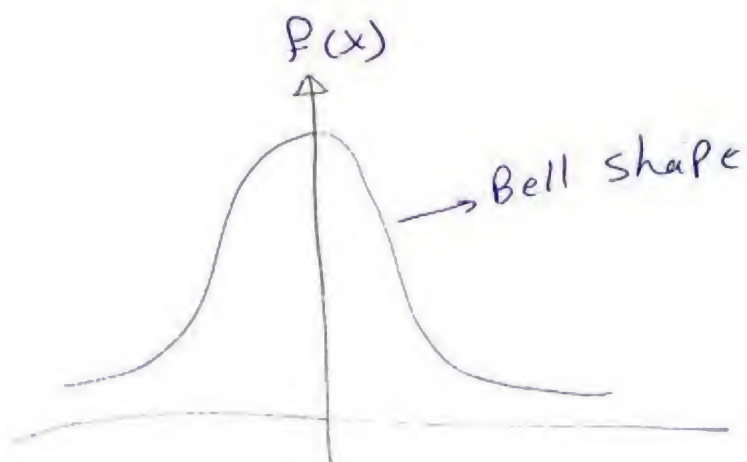


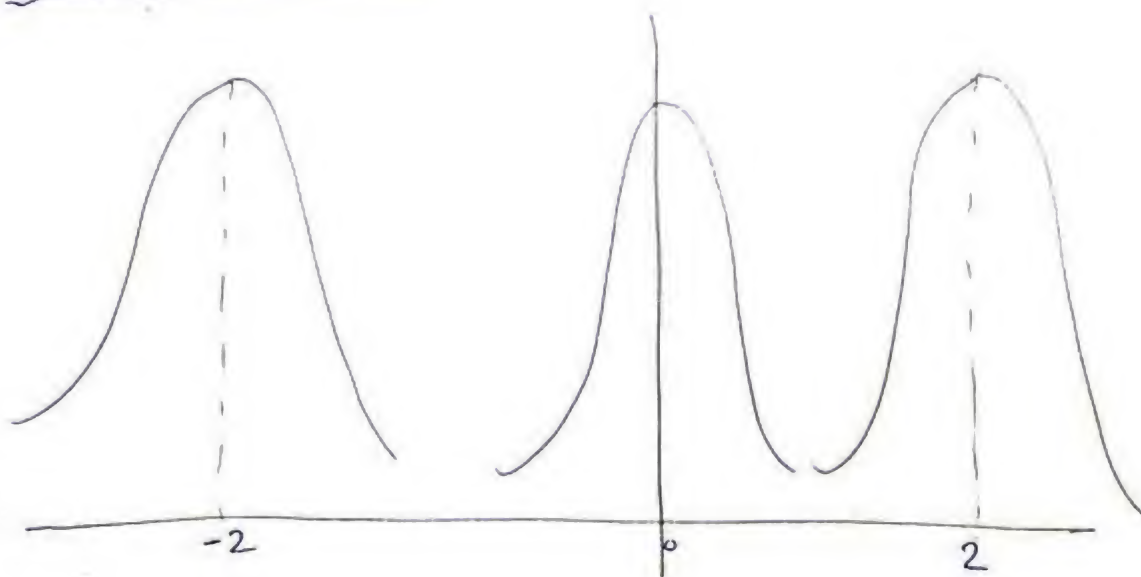
Stochastic ~~Sec~~ Sec 7

Normal Distribution
"Gaussian Distribution"

$$f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{1}{2} \frac{(x-\mu)^2}{\sigma^2}}$$

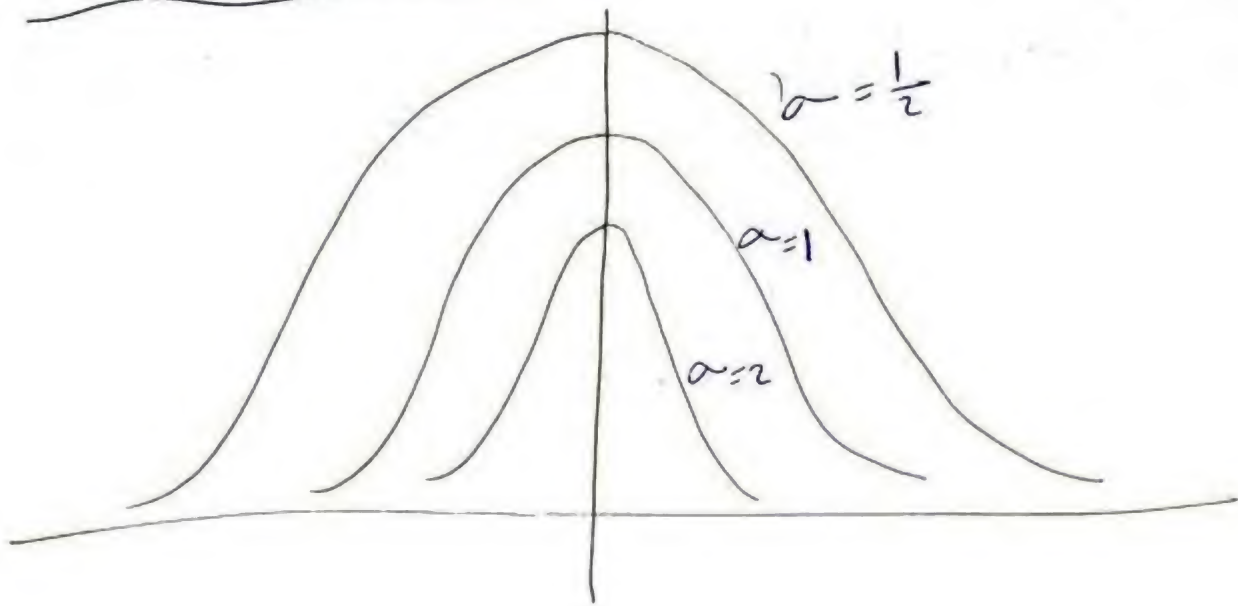


* Variation of μ



$$\mu = 0 \quad \sigma = 1$$

Variation of σ



Note

* When $\sigma = 1$, $\mu = 0$

↳ standard normal distribution

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}x^2}$$

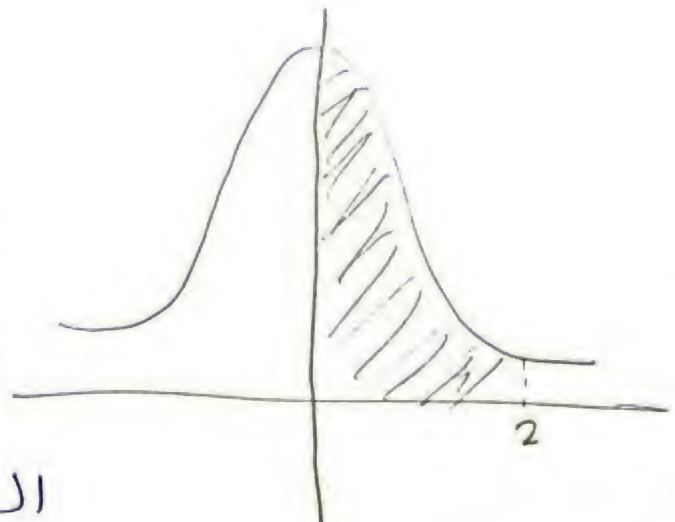
$\pi \rightarrow$ in radian

$$P(0 \leq x \leq 2)$$

هو تكامل المنطقة المحيطة

له صيغة معينة جداً يمكننا

ال (area) من 0 إلى 2



Z	0.0	0.01	0.02	0.03	...
0.0					
0.1					
0.2					
0.3					
0.4					
0.5					

if $z = 0.21$
 represent area we need

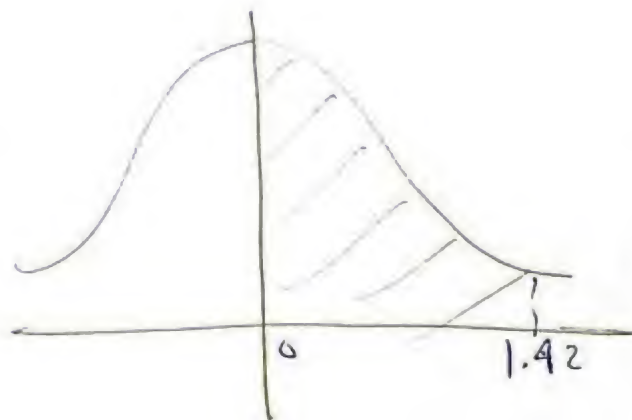
الجدول في الموقع

sheet 6

[3] Let x be a random Variable, with the standard normal distribution Φ .
 $\sigma = 1, \mu = 0$

1) $P(0 \leq x \leq 1.42)$ $\longrightarrow$ تكامل اذ احسبنا الجدول

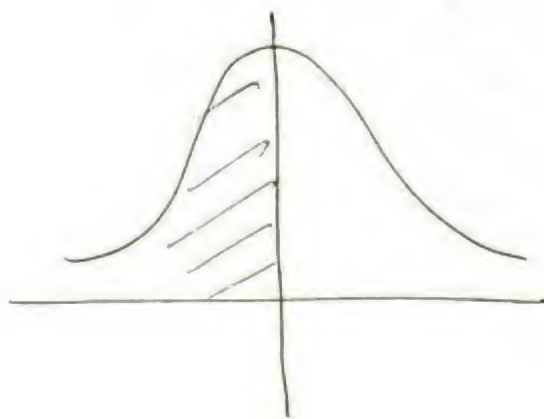
$$= 0.4222$$



$$ii) P(-0.73 \leq x \leq 0)$$

المبين يرى الشمال والجدول
ماض بالموجب يس.

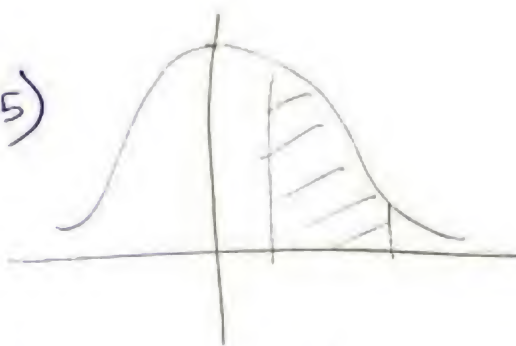
$$P = 0.2673$$



$$iii) P(0.65 \leq x \leq 1.26)$$

$$= P(0 \leq x \leq 1.26) - P(0 \leq x \leq 0.65)$$

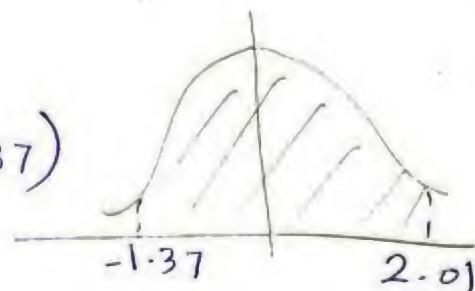
$$= 0.1540$$



$$iv) P(-1.37 \leq x \leq 2.01)$$

$$= P(0 \leq x \leq 2.01) + P(0 \leq x \leq 1.37)$$

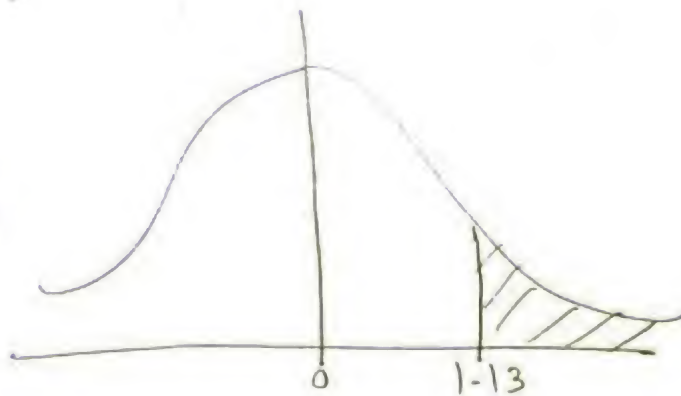
$$= 0.8925$$



$$* P(x \geq 1.13)$$

$$= 0.5 - P(0 \leq x \leq 1.13)$$

$$= 0.1292$$



0.5 →

$$P(|x| \leq 0.5) = P(-0.5 \leq x \leq 0.5)$$

$$= 2 * P(0 \leq x \leq 0.5)$$

* the values of μ, σ

$$\mu = \checkmark$$

$$\sigma = \checkmark$$

$$\mu = 0$$

$$\sigma = 1$$

Variable

Standard value (t)

$$t = \frac{x - \mu}{\sigma}$$

Actual value (x)

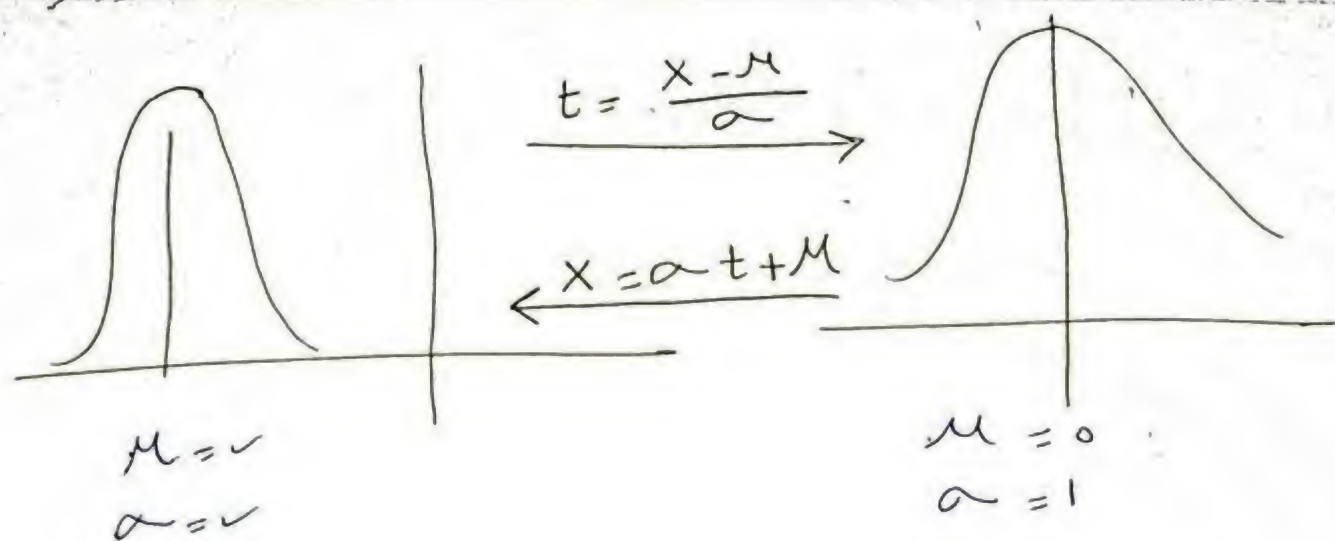
$$x = \sigma t + \mu$$

(Standard) $\mu = \checkmark, \sigma = 1$ ← دغايز تحويلها لـ

$$t = \frac{x - \mu}{\sigma} \quad \text{تحويل Mapping}$$

$$x = \sigma t + \mu$$

ولو غايز ترجعها للأصل فتستخدم



[5] Suppose the weight measurements w of 800 girls are normally distributed with mean 66 Kg and standard deviation 5 Kg. Find number of girls with weights

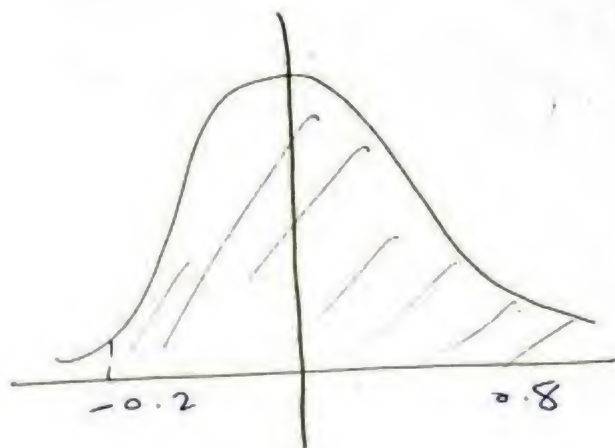
- between 65 and ~~70~~ 70
- greater than or equal to 72.

i) $P(65 \leq x \leq 70)$

$$t_1 = \frac{65 - 66}{5} = -0.2$$

$$t_2 = \frac{70 - 66}{5} = 0.8$$

$$P = 0.3674$$



$$N = 0.3674 \times 800$$

≈ 294 girls

$$ii) \left({}^{0.5-} P(\overset{0}{\cancel{0.5}} \leq x \leq 72) \right)$$

$N = \infty$

1 The mean and standard deviation on an examination are 74 and 12 respectively. Find the scores in standard units of students receiving marks

i) 65

ii) 74

iii) 86

iv) 92

i) $t = \frac{X - \mu}{\sigma} = -0.75$

$$P(-0.75 \leq x \leq 0) = 0.2734$$

[2] Find the marks corresponding to standard scores ($\mu = 74, \sigma = 12$)

i) -1 ii) 0.5 iii) 1.25 iv) 1.75

عائز (Actual value) و القیم دی (Standard)

i) -1

$$X = \sigma t + \mu = 12(-1) + 74 = 62$$

[8]